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IN THE CLAIMS:

Please examine claims 1-22 found on the Amended Pages attached to the International Preliminary Report on Patentability.

The following is a complete listing of claims in this application.

1. (original) A method for processing signals which are generated during the non-destructive examination of objects (12, 24), e.g. pipes or sheet metal, by reflection of ultrasonic waves at defect locations (20, AF) of the structure of the object (12, 24), comprising the steps of:

-emission of a complete wave front onto at least one section of the object (12, 24) to be examined by means of a plurality of independent transmitter elements (EL1 - ELN),

-reception of a wave reflected by the structure of the object by means of a plurality of receiver elements (EL1 - ELN) which are independent of one another,

-digitalizing the signals received from the receiver elements (EL1 - ELN),

-storage of the digitalized signals according to amplitude and propagation time in a storage element (SP),

characterized in that

the defect locations (20) are detected by a phase-locked addition of the stored amplitude values along a propagation time.

2. (original) The method according to claim 1, characterized in that to identify a defect location (outer defect) (20, AF) on an outer surface (54) of the object (12, 24) facing the probe (14, 26, 28), the point-wave signals passing from the defect location (20, AF) are evaluated.

3. (currently amended) The method according to claim 1 ~~or 2~~, characterized in that the detection of the defect location

(AF) on the outer surface of the object (12, 24), i.e. the surface facing the probe (14, 26, 28),is effected by an addition of those amplitude values stored in the storage module (SP) which are derived from the point-wave signals proceeding from the outer defect (AF).

4. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 1, characterized in that the addition extends at a right angle or essentially at a right angle to the interference pattern of the received amplitude values of the point waves of the outer defects (AF).

5 (currently amended) The method according to ~~at least one of the preceding claims~~ claim 1, characterized in that the detection of the outer defect (AF) is effected by a comparison of the sum signal determined during the phase-locked addition of the stored amplitude values along a propagation time with the sum signal determined during the addition of the amplitude values of the interference pattern, an outer defect (AF) being present if both sum signals indicate a defect location (coincidence method).

6. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 1, characterized in that the individual transmitter elements (EL1 - ELN) are controlled in a time-delayed manner (phasing) to set a beam angle α adapted to the test conditions, e.g. type of defect, size of defect, type of material, material form.

7. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 1, characterized in that a propagation time dependent amplitude correction of the sum signal determined during the addition is performed to identify the location of the defect.

8. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 1, characterized in that the

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received signals are filtered, preferably wavelet filtered, after their digitalization for the data reduction.

9. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 1, characterized in that the contour of a surface (68, 70) of the object (12, 24, 66) to be examined is recorded and stored,

the independent transmitter elements (EL1 - ELN) are controlled in a time-delayed manner in such a way that the emanating wave front (74) extends parallel or approximately parallel to the contour of the surface (68, 70) of the object (66) and the waves reflected by the object (66) are received in a time-delayed manner and generate an essentially planar interference pattern (76).

10. (original) A method for the non-destructive examination of a contour of an object (12, 24, 66) by processing signal waves which are generated by reflection of ultrasonic waves at defect locations (20, AF) of the structure of the object (12, 24), comprising the steps of:

-emission of a complete wave front onto the at least one contour of the object (12, 24, 66) to be examined by means of a plurality of independent transmitter elements (EL1 - ELN),

-reception a wave reflected by the structure of the object by means of a plurality of receiver elements (EL1 - ELN) which are independent of one another,

-digitalizing the signals received from the receiver elements (EL1 - ELN),

-storing the digitalized signals according to amplitude and propagation time in a storage element (SP),

characterized in that

the contour of a surface (68, 70) of the object (12, 24, 66) to be examined is recorded and stored,

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the independent transmitter elements (EL1 - ELN) are controlled in a time-delayed manner in such a way that the emanating wave front (74) extends parallel or approximately parallel to the contour of the surface (68, 70) of the object (66) and the waves reflected by the object (66) are received in a time-delayed manner and generate a substantially planar interference pattern (76).

11. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 10, characterized in that the contour of the object (66) is determined by emitting, for example, a planar wave front (64) onto the contour to be examined,

the waves reflected by the contour of the object (66) are received, digitalized by means of the plurality of receiver elements (EL1 - ELN) which are independent of one another and the digitalized signals are stored in the storage element (SP) at least according to propagation time,

the contour of the object is computed from a defined distance (A) of the probe to the object (66) and the different propagation times of the received signals.

12. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 10, characterized in that an interference pattern (76) determined from the received signals is compared with a desired pattern and that, when there is a deviation from the desired pattern, a renewed contour measurement is performed.

13. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 10, characterized in that a subsequent determination of the contour of the object to be examined occurs during an measuring process.

14. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 10, characterized in that the

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wave front (74) extending parallel or essentially parallel to the contour of the object (66) to be examined is generated by a time-delayed emission of sound pulses.

15. (currently amended) The method according to ~~at least one of the preceding claims~~ claim 10, characterized in that the received planar interference pattern (76) is received by time-delayed actuation of the receiver elements (EL1 - ELN) which are independent of one another in dependence on the contour values stored in the storage unit.

16. (original) A circuit arrangement (22) for processing signals which are generated during the non-destructive examination of objects, e.g. pipes, sheet metal, by reflection of ultrasonic waves at defect locations of the structure of the object, comprising a signal recording unit (38) with a pulse generator (PE) for actuating transmitter/receiver elements (EL1 - ELN) for emitting a complete wave front and for switching the transmitter/receiver elements (EL1 - EL2) to receive, wherein a multiplexer (MUX) is provided via which analog signals applied to the receiver elements can be transmitted to A/D converters (AD1 - ADN), the outputs of which are connected to a storage element (SP) for storing digitalized signals,

characterized in that

the digitalized signals are stored in the storage element (SP) with respect to their signal amplitude and propagation time and a summing element (SUM) for the phase-locked addition of the amplitude values stored in the storage element (SP) is arranged in tandem behind the storage element (SP) and a signal which can be evaluated with respect to the defect location (20) is applied to an output of the summing circuit (SUM).

17. (original) The circuit arrangement according to claim 16, characterized in that the output of the summing element (SUM) is preferably connected via an interface I with an

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evaluation circuit (46) in which an output of the summing element (SUM) is connected with a signal processing circuit (46) which has one or more evaluation modules (F1, F2) for the further assessment and evaluation of the signal applied to the output of the summing element (SUM).

18. (currently amended) The circuit arrangement according to claim 16 ~~or 17~~, characterized in that the evaluation module (F1, F2) has a coincidence circuit for comparing the sum signals during a phase-locked addition of the amplitude values along a propagation time with the sum signals during addition of the amplitude values of the point-wave signals of outer defects.

19. (currently amended) The circuit arrangement according to claim 16 ~~to 18~~, characterized in that the probe (14, 26, 28) is configured as a Phased Array Transducer.

20. (currently amended) The circuit arrangement according to claim 16 ~~to 19~~, characterized in that the transmitter/ receiver elements (EL1 - ELN) can be controlled simultaneously or in a phase-shifted manner (phasing).

21. (currently amended) The circuit arrangement according to claim 16 ~~to 20~~, characterized in that the transmitter/receiver elements (EL1 - ELN) are made as a unit.

22. (currently amended) The circuit arrangement according to claim 16 ~~to 21~~, characterized in that the transmitter elements and receiver elements are made as separate units.

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